What is it that makes animals look the way they do? Some of the factors that determine how a prey species will look are the environment and how predators react to their prey in the environment. The environment creates the conditions that the prey species must live in.

In this activity, your group will set up an artificial environment. In this environment there will be three components. The first component is the background which will represent the actual ground. There are 2 different pieces of paper to represent different environment. The second component will be the worms (prey), represented by 2 different color toothpicks. The different colors represent the two different phenotypes present in the worm population. You will play the part of the third component, the bird (predator).

Steps:

1. Gather the paper bag, the box of toothpicks, and the colored backgrounds.
2. Place 5 of each color toothpicks in the bag and shake it up.
3. Dump the toothpicks out of the bag and onto the paper background.
4. Now, whoever is the bird must grab the first toothpick that you see and move it off of the paper and look away.
5. Look back and grab and the first toothpick you see and remove it from the paper.
6. Repeat this 5 times.
7. Put the removed toothpicks in a discard bag.
8. Count out the number of toothpicks of each color that remain.
9. Then for each one of the toothpicks present add 2 of the same color toothpicks to the paper bag.
10. Record the number of each color worms that were eaten, the number that survived, the number of new offspring, and the new total population for each color.
11. Shake the bag again and dump the toothpicks out on the paper background and repeat the previous steps.
12. Continue this process for three generations of worms.

Pre-activity questions:

What does the title mean by which worm will **win**?

What is predation rate?

What is environmental pressure?

Make a hypothesis about what you think will occur to the population of worms that live under the green environmental background in the beginning of the activity to the end of the activity. And why do you think this will happen?

What do you think the ending outcome will be for the worm population under the red environmental background?

These first two tables are to be used for the green background.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **GREEN WORMS** | Original Amount of Worms | Number of Eaten Worms | Number of Offspring (remaining worms x2) | Final Number of Worms (Original – Eaten + Offspring) |
| Generation #1 |  |  |  |  |
| Generation #2 |  |  |  |  |
| Generation #3 |  |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **RED WORMS** | Original Amount | Number of Eaten | Number of Offspring (remaining worms x2) | Final Number of Worms (Original – Eaten + Offspring) |
| Generation #1 |  |  |  |  |
| Generation #2 |  |  |  |  |
| Generation #3 |  |  |  |  |

These second two tables are to be used for the red background.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **GREEN WORMS** | Original Amount of Worms | Number of Eaten Worms | Number of Offspring (remaining worms x2) | Final Number of Worms (Original – Eaten + Offspring) |
| Generation #1 |  |  |  |  |
| Generation #2 |  |  |  |  |
| Generation #3 |  |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **BLUE WORMS** | Original Amount | Number of Eaten | Number of Offspring (remaining worms x2) | Final Number of Worms (Original – Eaten + Offspring) |
| Generation #1 |  |  |  |  |
| Generation #2 |  |  |  |  |
| Generation #3 |  |  |  |  |

Post-activity questions:

Which population of colored worms “won” under each of the colors of background?

Under what environmental background do you think that both colors would be present?

Explain the Peppered moth scenario and how it applies to this activity.

What other animals do you think are affected in a similar manner as this?

Now let’s go deeper, how do you think it is that humans have came about to look the ways that we do today? Without doing research present your initial ideas about the physical nature of human beings in a half page short essay. This is whatever you think the reasoning is behind the characteristics of human beings. It doesn’t have to be the correct reasoning, just what you think it is. If you can, try and relate some of your ideas to the worms activity.